PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 032873wo/Me/mh	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP 03/14654	International filing date *(day/month/year)* 19.12.2003	Priority date *(day/month/year)* 19.12.2002
International Patent Classification (IPC) or both national classification and IPC C07K14/81		
Applicant IPF PHARMACEUTICALS et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 8 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
19.07.2004	31.05.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Fuhr, C Telephone No. +31 70 340-3510

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/14654

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-37 as originally filed

Sequence listings part of the description, Pages

1-33 as originally filed

Claims, Numbers

1-21 received on 23.02.2005 with letter of 22.02.2005

Drawings, Sheets

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☒ contained in the international application in written form.

   ☒ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	5-8,10,15,16,18,19,21
	No:	Claims	1-4,9,11-14,17,20
Inventive step (IS)	Yes:	Claims	5-8,10
	No:	Claims	1-4,9,11-21
Industrial applicability (IA)	Yes:	Claims	1-21
	No:	Claims	

2. Citations and explanations

   see separate sheet

1 Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The following **documents** are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: WO 01 34640 A (ADERMANN KNUT ;KIRCHHOFF FRANK (DE); MUENCH JAN (DE); FORSSMANN WO) 17 May 2001 (2001-05-17)

1.1 Novelty (Article 33(2) PCT)

1.1.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-4, 9, 11-14,17, 20 is not new in the sense of Article 33(2) PCT.

1.1.2 D1 discloses peptide called VIRIP having sequence Z1-LEAIPMSIPPEVKFNKPFVF-Z2, wherein Z1 and Z2 have the same meaning as in the application; the scope of the claims of D1 includes fragments, derivatives and variants of the same type as in the application including those wherein one or more amino acids are added, removed or mutated. The claims further encompass nucleic acids, antibodies, pharmaceutical and/or galenic formulations and uses for therapeutic and diagnostic purposes (claims 1-4,8,9,14-19 and page 4, 3rd paragraph).

1.1.3 Due to the fact that claims 1-4 include fragments, mutants and derivatives, the peptide disclosed in D1 falls under the scope of said claims. So lysine is mentioned explicitely in position X8 in claim 4.
The argument, that the fragments, derivatives and variants of the peptide of D1 are not further disclosed, is not valid. The peptide VIRIP as disclosed in D1, examples 2 and 3 falls under the scope of claims 1-4, because it includes peptides which are fragments, oligomers, derivatives and/or mutants. The term fragment is defined to be 'sequence variants in which the sequence is truncated at the N- or C-terminus' (page 11, lines 6-8), the term oligomer is defined to be 'multiple peptide chains covalently linked to each other' (page 11, lines 11-13, the term derivative is defined to be "a chemically modified peptide' (see page

11, lines19-20) and the term mutant is defined to be 'a sequence variant, in which one ormore of the amino acids as disclosed are changed' (page 10, lines 29-30). All other definitions of said terms given in the descrition are directed to special embodiments and therefor not limiting.
This is even more so true for the argument that the scope of the claims only encompasses peptides which have at least one of the positions 3, 11 or 13 changed compared to VIRIP, so that the peptides of invention for a selection invention of those disclosed in D1. The peptides VIR-121 and VIR-243 are special embodiments of the invention (claim 8), and they fall under the scope of claims 1-4. With just a single amino acid mutation (at position X5 from p to P in case of VIR-121; at position X7 from F to V) their structure could be transformed to VIRIP. As long as claims 1-4 have a scope including fragments, oligomers, derivatives and/or mutants, the peptide of D1 falls under the scope of said claims.
The present application does not meet the requirements of Article 33(1) PCT because the subject-matter of claims 1-4 is not new in the sense of Article 33(2) PCT. As far as the subject matter of claims 9, 11-14, 17, 20 relates to the compounds of claims 1-4 it is also not novel.

1.1.4 Claims 5-8, 10, 15-16, 18-19 and 21 are novel.

1.2 Inventive Step (Article 33(3) PCT)

1.2.1 Document D1 is considered to represent the most relevant state of the art and discloses peptide VIRIP and its activity to inhibit HIV replication (cf. examples 4 and 5). The subject-matter of claim 5-8 and 10 differs in that the claimed peptides have at least one amino acid substitution compared to VIRIP. According to page 13, 2nd paragraph the amino acid substitution changes the structure of the peptide by introducing either d-proline at position 10 or two cysteine residues at positions 6 and 10 which form an intramolecular disulfide bond or exchange lysine at position 13 against an amino acid with a hydrophobic or aromatic side chain. These measures result in 'peptides with an significantly increased activity against HIV'.

1.2.2 The problem to be solved by the present invention may therefore be regarded as providing derivatives of VIRIP which inhibit HIV infection having increased

activity.

1.2.3 In view of the above, the present application meets the requirements of Article 33(3) PCT, because the subject-matter of claims 5-8 and 10 involves an inventive step, because example 3 on page 29 shows that the VIRIP derivatives of application have a 'greatly enhanced anti-HIV-1 activity as compared to VIRIP'. In fact they inhibit the infection of target cells by two model HIV-1 clones with an 10 fold to 100 fold efficiency compared to original VIRIP (cf page 30 1st paragraph and table on pages 30-33).

1.2.4 The assessment of the inventive step of claims 11-21 depends on the novelty and inventivity of the underlying peptides. As far as these claims relate to and/or are dependend to subject matter of claims 1-4, they are not inventive.

2 Re Item VIII
Certain observations on the international application

2.1 It is unclear what is meant by peptides being 'fragments', 'oligomers', 'derivatives' or 'mutants'. These expressions may comprise a wide range of compounds and are therefore speculative, embracing a great variety of possibilities not yet explored by the applicant, the effect of which cannot be expected nor predicted by the skilled person using the teaching disclosed in the current application and his technical knowledge to reproduce without undue burden all the possibilities which are actually claimed.

The argument that the description comprises precise definitions for said terms could not be followed, As presented in paragraph 1.1.3 above, the description defines said terms in the broadest possible and unprecise manner.

Claims 1-4 and the claims 5-7, 9-10 which are dependent thereon are unclear (Article 6 PCT).

2.2 Claim 4 relates to a peptide having i.a. a lysine at position X8. This is in contradiction with the description, which states on page 9, that the peptides of the present invention differ at least from VIRIP in amino acid position 13, 'where VIRIP contains a lysine residues, while the peptides of the present invention do not contain a lysine residues at amino acid position 13'.

The argument that the cited passage has to be read in the context of text of page 9, line 25 - page 10, line 6 could be followed. Said paragraph reads that the 'peptides of

the present invention are related to ..... VIRIP .... They all differ from VIRIP at least in amino acid position 13. In addition to that, the peptides of the present invention have further amino aicd changes throughout their 21 amino acids in comparision to VIRIP. The IPEA cannot read this paragraph in a way that it meant to describe peptides differing trom VIRIP at various amino acid positions, inter alia at position 13. Thus, claim 4 is not supported under Article 6 PCT.

2.3 Claim 10 is directed to peptides, having an 'IC50 of equal or below 6500 nM'. The claim does not define the parameter any further nor elaborates, how it was measured.

The argument that IC50 meant the concentration at which 50 % of HIV are prevented to enter/fuse a cultured cell in vivo and that therefore the claim was clear could not be followed, because the description shed a different light on this issue. Table 2 on pages 30-33 and example 3 describe that compounds of present invention can have different IC50 values in assays using different types of HIV. It seems quite probable that under a slightly different assay protocol or using a different HIV strain the IC50 of the peptides of invention could exceed 6500 nM.

Consequently, claim 10 is unclear (Article 6 PCT).

2.4 Claim 7 relates to peptides according to claims 1-6 wherein leucine of position 1 is covalently linked to glutamic acid at position 2 by one of a variety of chemical bonds different to a natural peptide bond. As it is unclear which atoms of the two amino acids are to be linked and in the absence of any indication throughout the whole application which of these putative bonds link which particular atoms it appears that claim 7 lacks support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT. The argument that a person skilled in the art knew which particular atom of the amino acids glutamic acid and lysine participate in said bond could not be followed because lysine was not mentioned in the wording of claim 7.

Claims

1. Peptides with biological activity against infection by HIV, having the amino acid sequence

Z_1-LE-X_1-IP-X_2-X_3-X_4-P-X_5-X_6-X_7-X_8- X_9-X_{10}-K-X_{11}-X_{12}-X_{13}-X_{14}-X_{15}-Z_2,

wherein

X_1 is a lysine, alanine, or aspartic acid;

X_2 is a cysteine, methionine or isoleucine;

X_3 is a serine, cysteine, lysine or glycine;

X_4 is an isoleucine, alanine, phenylalanine or cysteine;

X_5 is a proline, D-proline or a substituted L-or D-proline;

X_6 is a cysteine or glutamic acid;

X_7 is an amino acid with a hydrophobic or an aromatic side chain or cysteine;

X_8 is an amino acid with a hydrophobic or an aromatic side chain or cysteine;

X_9 is an amino acid with an aromatic side chain;

X_{10} is a glycine, alanine or asparagine;

X_{11} is a proline, aspartic acid, octahydroindolyl-2-carboxylic acid or D-1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid;

X_{12} is a phenylalanine, alanine, glycine, glutamic acid or D-1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid;

X_{13} is an amino acid with a hydrophobic or an aromatic side chain;

X_{14} is an amino acid with a hydrophobic or an aromatic side chain;

X_{15} is a phenylalanine or deletion;

Z_1 is NH_2 or a sequence of 1 to 10 amino acid residues;

Z_2 is COOH or a sequence of 1 to 10 amino acid residues;

and peptides which are fragments and/or covalently linked oligomers and/or derivatives, especially amidated, alkylated, acylated, sulfated, pegylated, phosphorylated and/or glycosylated derivatives, and mutants thereof;

and with the provisio that

(a) if X_{12} is alanine, glycine, glutamic acid, or D-1,2,3,4-

tetrahydroisoquinoline-3-carboxylic acid than X_{13}, X_{14} and X_{15} are phenylalanine, valine and phenylalanine respectively; and/or

(b) if X_{12} is phenylalanine, than X_{13}, X_{14} and X_{15} are valine, phenylalanine and a deletion, respectively; and

(c) that there are at maximum two cysteine residues in a peptide.

2. Peptides according to claim 1 with a biological activity against infection by HIV having the amino acid sequence

Z_1-LE-X_1-IP-X_2-X_3-X_4-P-X_5-X_6-X_7-X_8- X_9-X_{10}-K-X_{11}-FVF-Z_2,

wherein

X_1 is a lysine, alanine or aspartic acid;

X_2 is a cysteine, methionine or isoleucine;

X_3 is a serine, cysteine or glycine;

X_4 is a isoleucine or cysteine;

X_5 is a proline, D-proline or any substituted L- or D-proline;

X_6 is a cysteine or glutamic acid;

X_7 is a phenylalanine, cysteine, valine, isoleucine or 3,3-diphenylalanine;

X_8 is a phenylalanine, leucine, alanine, glycine, cysteine, D-1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid or L-1,2,3,4-tetrahydro-isoquinoline-3-carboxylic acid;

X_9 is an amino acid with an aromatic side chain;

X_{10} is a glycine or asparagine;

X_{11} is a proline or D-1,2,3,4-tetrahydroisoquinoline-3-carboxylic;

Z_1 is NH_2 or a sequence of 1 to 10 amino acid residues;

Z_2 is COOH or a sequence of 1 to 10 amino acid residues;

and peptides which are fragments and/or covalently linked oligomers and/or derivatives, especially amidated, alkylated, acylated, sulfated, pegylated, phosphorylated and/or glycosylated derivatives, and mutants thereof,

with the provisio that

(a) if two cysteine residues are present, said residues are separated by four other amino acid residues; and

(b) L-1,2,3,4-tetrahydro-isoquinoline-3-carboxylic acid (L-Tic), D-

1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid (D-Tic) and/or 3,3-diphenylalanine are present, no cysteine residue is present.

3. Peptides according to claims 1 to 2 with a biological activity against infection by HIV, having the amino acid sequence
Z_1-LE-X_1-IP-X_2-X_3-IP-X_5-X_6-X_7-X_8-F-X_{10}-KPFVF-Z_2,
wherein
X_1 is a lysine, alanine or aspartic acid;
X_2 is a cysteine, methionine or isoleucine;
X_3 is a serine or glycine;
X_5 is a L-proline, D-proline or any substituted L- or D-proline
X_6 is a cysteine or glutamic acid;
X_7 is a phenyalalnine or valine;
X_8 is a phenylalanine, leucine, alanine or L-1,2,3,4-tetrahydro-isoquinoline-3-carboxylic acid;
X_{10} is a glycine or asparagine;
Z_1 is NH_2 or a sequence of 1 to 10 amino acid residues;
Z_2 is COOH or a sequence of 1 to 10 amino acid residues, and
and peptides which are fragments and/or covalently linked oligomers and/or derivatives, especially amidated, alkylated, acylated, sulfated, pegylated, phosphorylated and/or glycosylated derivatives, and mutants thereof.

4. Peptides according to claim 1 to 3, having the amino acid sequence
Z_1-LEAIP-X_2-SIP-X_5-X_6-V-X_8-FNKPFVF-Z_2,
wherein
X_2 and X_6 are cysteines, or X_2 is methionine and X_6 is glutamic acid
X_5 is a D-proline or L-proline;
X_8 is an amino acid with a hydrophobic or an aromatic side chain or lysine;
Z_1 is NH_2 or a sequence of 1 to 10 amino acid residues;
Z_2 is COOH or a sequence of 1 to 10 amino acid residues;
and peptides which are fragments and/or covalently linked oligomers and/or derivatives, especially amidated, alkylated, acylated, sulfated,

pegylated, phosphorylated and/or glycosylated derivatives, and mutants thereof, with biological activity against infection by HIV,
with the proviso that at least one of the following is true:
X_5 is D-proline or
X_8 is not lysine or
X_2 and X_6 are cysteine.

5. Peptides according to anyone of the claim 1 to 4, wherein the cysteine residues at positions 6 and 11, 6 and 12, 7 and 12, or 8 and 13 are connected by an intramolecular disulfide bond.

6. Peptides according to anyone of the claim 1 to 4, with a single cysteine residue, wherein said cysteine residue is connected by an intermolecular disulfide bond to another peptide with a single cysteine residue, forming a homo-dimer.

7. Peptides according to anyone of the claims 1 to 6, wherein the leucine residue at amino acid position 1 and the glutamic acid at amino acid position 2 are covalently linked by an N-alkylated amide bond or by an ester bond or by a reduced peptide bond or by a retro-inverso peptide bond or by an N-alkylated retro-inverso peptide bond.

8. Peptides according to any of the claims 1 to 7 with one of the amino acid sequences

VIR-121	LEAIPMSIPpEVAFNKPFVF	SEQ ID NO. 2
VIR-161	LEAIPCSIPpCVAFNKPFVF	SEQ ID NO. 3
VIR-162	LEAIPCSIPPCVGFGKPFVF	SEQ ID NO. 4
VIR-163	LEAIPCSIPPCVLFNKPFVF	SEQ ID NO. 5
VIR-164	LEAIPCSIPPCVFFNKPFVF	SEQ ID NO. 6
VIR-165	LEAIPCSIPPCFAFNKPFVF	SEQ ID NO. 7
VIR-166	LEAIPCSIPPCVA(D-Tic)NKP(D-Tic)FVF	SEQ ID NO. 8
VIR-170	LEAIPMSIPPEVFFGKPFVF	SEQ ID NO. 9

VIR-175	LEAIPMSIPPEFLFGKPFVF	SEQ ID NO. 10
VIR-182	LEAIPMSIPPELAFAKPFVF	SEQ ID NO. 11
VIR-184	LEAIPMSIPPEIAFNKPFVF	SEQ ID NO. 12
VIR-190	LEAIPMSIPpEVGFGKPFVF	SEQ ID NO. 13
VIR-191	LEAIPMSIPpEVLFGKPFVF	SEQ ID NO. 14
VIR-192	LEAIPMSIPpEVFFGKPFVF	SEQ ID NO. 15
VIR-193	LEAIPMSIPpEFAFNKPFVF	SEQ ID NO. 16
VIR-197	LEAIPMSIPpEVFFNKPFVF	SEQ ID NO. 17
VIR-199	LEAIPMSIPpEFLFNKPFVF	SEQ ID NO. 18
VIR-229	LEAIPISIPpEVAFNKPFVF	SEQ ID NO. 19
VIR-234	LEAIPMGIPpEVAFNKPFVF	SEQ ID NO. 20
VIR-243	LEAIPMSIPPEFAFNKDFVF	SEQ ID NO. 21
VIR-252	LEDIPMSIPpEVAFNKPFVF	SEQ ID NO. 22
VIR-255	LEKIPMSIPpEVAFNKPFVF	SEQ ID NO. 23
VIR-257	LEAIPMSIPpEV(cyclohexylalanine)FNKPFVF	SEQ ID NO. 24
VIR-258	LEAIPMSIPpE(1-naphthylalanine)AFNKPFVF	SEQ ID NO. 25
VIR-259	LEAIPMSIPpE(p-fluorophenylanine)AFNKPFVF	SEQ ID NO. 26
VIR-260	LEAIPMSIPpEV(4-pyridylalanine)FNKPFVF	SEQ ID NO. 27
VIR-261	LEAIPMSIPpE(3,3-diphenylalanine)AFNKPFVF	SEQ ID NO. 28
VIR-262	LEAIPMSIPpEV(D-Tic)FNKPFVF	SEQ ID NO. 29
VIR-263	LEAIPMSIPpEV(L-Tic)FNKPFVF	SEQ ID NO. 30
VIR-264	LEAIPMSIPpEV(3-benzothienylalanine)FNKPFVF	SEQ ID NO. 31
VIR-265	LEAIPMSIPpEV(3-thienylalanine)FNKPFVF	SEQ ID NO. 32
VIR-266	LEAIPMSIPpEVWFNKPFVF	SEQ ID NO. 33
VIR-268	LEAIPMSIPpEVAFNK(L-Tic)FVF	SEQ ID NO. 34
VIR-269	LEAIPMSIPpEVAFNK(Oic)FVF	SEQ ID NO. 35
VIR-272	LEAIPMCIPPECLFNKPFVF	SEQ ID NO. 36
VIR-273	LEAIPMCIPPECFFNKPFVF	SEQ ID NO. 37
VIR-274	LEAIPMCIPPECLFGKPFVF	SEQ ID NO. 38
VIR-280	LEAIPCSIPPCFLFGKPFVF	SEQ ID NO. 39
VIR-284	LEAIPISIPPEVFFGKPFVF	SEQ ID NO. 40
VIR-286	LEAIPISIPPELAFAKPFVF	SEQ ID NO. 41
VIR-290	LEAIPISIPpEVFFGKPFVF	SEQ ID NO. 42

VIR-298	LEAIPISIPpEVWFNKPFVF	SEQ ID NO. 43
VIR-320	LEAIPMGIPpEVFFGKPFVF	SEQ ID NO. 44
VIR-322	LEAIPMGIPpEVFFNKPFVF	SEQ ID NO. 45
VIR-323	LEAIPMGIPpEFLFNKPFVF	SEQ ID NO. 46
VIR-326	LEDIPMGIPpEVAFNKPFVF	SEQ ID NO. 47
VIR-328	LEAIPMGIPpEVWFNKPFVF	SEQ ID NO. 48
VIR-344	LEAIPCSIPPCVFFGKPFVF	SEQ ID NO. 49
VIR-345	LEAIPCSIPPCFLFGKPFVF	SEQ ID NO. 50
VIR-346	LEAIPCSIPPCLAFAKPFVF	SEQ ID NO. 51
VIR-348	LEAIPCSIPpCVGFGKPFVF	SEQ ID NO. 52
VIR-350	LEAIPCSIPpCVFFGKPFVF	SEQ ID NO. 53
VIR-351	LEAIPCSIPpCFAFNKPFVF	SEQ ID NO. 54
VIR-352	LEAIPCSIPpCVFFNKPFVF	SEQ ID NO. 55
VIR-353	LEAIPCSIPpCFLFNKPFVF	SEQ ID NO. 56
VIR-354	LEAIPCSIPpCVAFNKPFVF	SEQ ID NO. 57
VIR-355	LEAIPCGIPpCVAFNKPFVF	SEQ ID NO. 58
VIR-356	LEAIPCSIPPCFAFNKDFVF	SEQ ID NO. 59
VIR-357	LEDIPCSIPpCVAFNKPFVF	SEQ ID NO. 60
VIR-358	LEKIPCSIPpCVAFNKPFVF	SEQ ID NO. 61
VIR-376	LEAIPMSIPpEFLFGKPAFVF	SEQ ID NO. 62
VIR-377	LEAIPMSIPpEFLFGKPGFVF	SEQ ID NO. 63
VIR-380	LEAIPMSIPpEFLFGKPFFVF	SEQ ID NO. 64
VIR-384	LEAIPMSIPpEFLFGKPEFVF	SEQ ID NO. 65
VIR-396	LEAIPMSAPpEFLFGKPFVF	SEQ ID NO. 66
VIR-400	LEAIPMSFPpEFLFGKPFVF	SEQ ID NO. 67
VIR-416	LEAIPMGIPpEFLFGKPFVF	SEQ ID NO. 68
VIR-418	LEKIPMGIPpEFLFGKPFVF	SEQ ID NO. 69
VIR-445	LEAIPISIPpEV(D-Tic)FNKPFVF	SEQ ID NO. 70
VIR-447	LEAIPISIPpEVAFNK(L-Tic)FVF	SEQ ID NO. 71
VIR-448	LEAIPMGIPpEV(D-Tic)FNKPFVF	SEQ ID NO. 72
VIR-449	LEAIPMGIPpEV(L-Tic)FNKPFVF	SEQ ID NO. 73
VIR-452	LEDIPMSIPpEV(L-Tic)FNKPFVF	SEQ ID NO. 74
VIR-454	LEKIPMSIPpEV(D-Tic)FNKPFVF	SEQ ID NO. 75

VIR-455	LEKIPMSIPpEV(L-Tic)FNKPFVF	SEQ ID NO. 76
VIR-479	LEDIPIGIPpEFLFNKPFVF	SEQ ID NO. 77
VIR-483	LEKIPIGIPpEV(D-Tic)FNKPFVF	SEQ ID NO. 78
VIR-484	LEKIPIGIPpEV(L-Tic)FNKPFVF	SEQ ID NO. 79
VIR-485	LEKIPIGIPpEVAFNK(L-Tic)FVF	SEQ ID NO. 80
VIR-487	LEDIPIGIPpEV(L-Tic)FNKPFVF	SEQ ID NO. 81
VIR-488	LEDIPIGIPpEVAFNK(L-Tic)FVF	SEQ ID NO. 82
VIR-512	*N-Me*-LEAIPMSIPPEFLFGKPFVF	SEQ ID NO. 83
VIR-568	LEAIPMSCPPEFCFGKPFVF	SEQ ID NO. 84
VIR-570	LEAIPCSIPPECLFGKPFVF	SEQ ID NO. 85
VIR-576	$(LEAIPCSIPPEFLFGKPFVF)_2$	SEQ ID NO. 86
VIR-580	LEAIPMSIPPEFLFGKPFVF-miniPEG	SEQ ID NO. 87
VIR-590	LEAIPMKIPPEFLFGKPFVF	SEQ ID NO. 88

9. The peptides according to anyone of claims 1 to 8, which interact with the fusion peptide of HIV.

10. The peptides according to anyone of claims 1 to 9, which have an IC_{50} of equal or below 6500 nM, preferably those having an IC_{50} of equal or below 2000 nM and most preferably those having an IC_{50} of equal or below 800 nM such as VIR-344 (SEQ ID NO. 49) with an IC_{50} of 348 nM, VIR-345 (SEQ ID NO. 50) with an IC_{50} of 298 nM, VIR-353 (SEQ ID NO. 56) with an IC_{50} of 225 nM, VIR-357 (SEQ ID NO. 60) with an IC_{50} of 497 nM, VIR-358 (SEQ ID NO. 61) with an IC_{50} of 706 nM, VIR-449 (SEQ ID NO. 73) with an IC_{50} of 274 nM, VIR-455 (SEQ ID NO. 76) with an IC_{50} of 134 nM, VIR-484 (SEQ ID NO. 79) with an IC_{50} of 100 nM, VIR-512 (SEQ ID NO. 83) with an IC_{50} of 138 nM, VIR-576 (SEQ ID NO. 86) with an IC_{50} of 107 nM and VIR-580 (SEQ ID NO. 87) with an IC_{50} of 150 nM.

11. Nucleic acids coding for peptides according to any of claims 1 to 10.

12. Antibodies binding specifically to peptides according to claims 1 to 10.

13. A medicament containing the peptides according to claims 1 to 10, nucleic acids of claim 11 or antibodies of claim 12.

14. The medicament of claim 13 in galenic formulations for oral, intravenous, intramuscular, intracutaneous, subcutaneous, intrathecal administration, and as an aerosol for transpulmonary administration.

15. The medicament of claim 13 or 14 comprising at least one further therapeutic agent.

16. The medicament of claim 15, wherein the said at least one further therapeutic agent is a viral protease inhibitor, a reverse transcriptase inhibitor, a fusion inhibitor, a cytokine, a cytokine inhibitor, a glycosylation inhibitor or a viral mRNA inhibitor.

17. Use of the peptides according to claims 1 to 10 for the manufacturing of a medicament for the treatment of HIV infections.

18. An assay for determining molecules capable of interaction with the fusion peptide of HIV, comprising a peptide according to anyone of claims 1 to 10.

19. Use of the peptides according to anyone of claims 1 to 10 in an assay according to claim 16.

20. A diagnostic agent containing peptides according to any of claims 1 to 10, nucleic acids according to claim 11 or antibodies according to claim 12.

21. Use of the diagnostic agent according to claim 18 for assay systems for testing isolated plasma, tissue, urine and cerebrospinal fluid levels for HIV infection.